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B65G 69/28, E01D 15/133

(52) UK CL (Edition S)

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(56) Documents Cited

GB 2238288 A GB 0417889 A US 5740575 A  
US 4912796 A

(58) Field of Search

UK CL (Edition R) B6H H3  
INT CL<sup>7</sup> B65G 69/28, B64F 7/24, E01D 15/133  
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(54) Abstract Title

Modular ramp

(57) A modular ramp, in particular for use as a loading ramp or walkway, comprises a plurality of ramp modules 1, each ramp module comprising a ramp frame having a pair of opposing frame end members and a pair of opposing frame side members 2 interconnecting said opposing end members. Each ramp module further comprises a first support leg 3 mountable on a first side member of the ramp frame and towards one end thereof and a second support leg 3 mountable on a second side member of the ramp frame and towards the same end thereof. The support legs are secured to the ramp frame by an adjustable mount 4, the adjustable mount being positioned at a desired elevation along the length of the respective leg. Each ramp frame has means for connection to an adjacent ramp frame. The adjustable mount allows the ramp frame to be selectively mounted on each of the support legs at one of a plurality of inclinations.

The adjustable mount can comprise a bracket A1 with holes for a nut and bolt A4, A5 and locking pins A2, A3 that can be adjustably positioned in a side frame central and surrounding circle of holes, respectively. Variations on this theme are also described (Fig 6-10). Preferably, a sleeve L2 and pin L5 allow height adjustment. A hand rail HR2, HR3 can be provided. Double width ramps (Fig 11) or ramps without reinforcing (Fig 12) are also described.

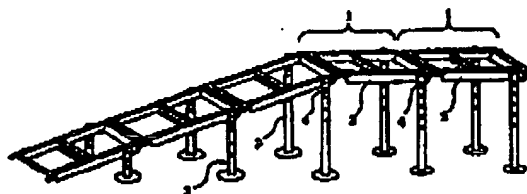


FIG. 1

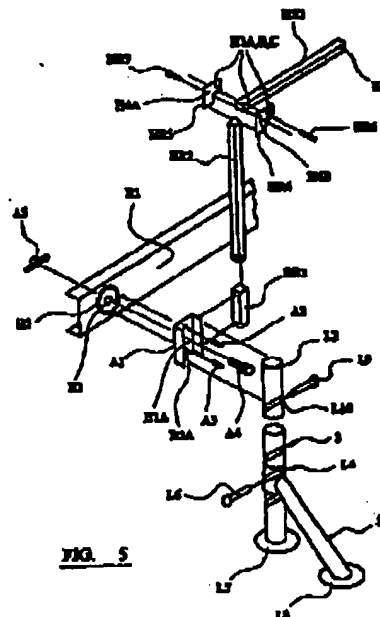


FIG. 5

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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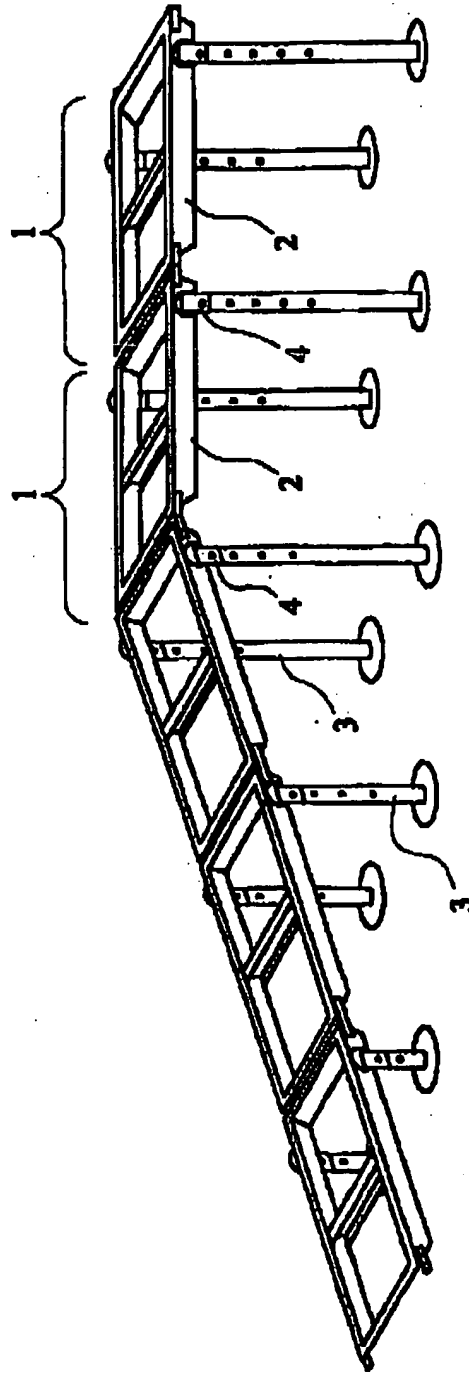


FIG. 1

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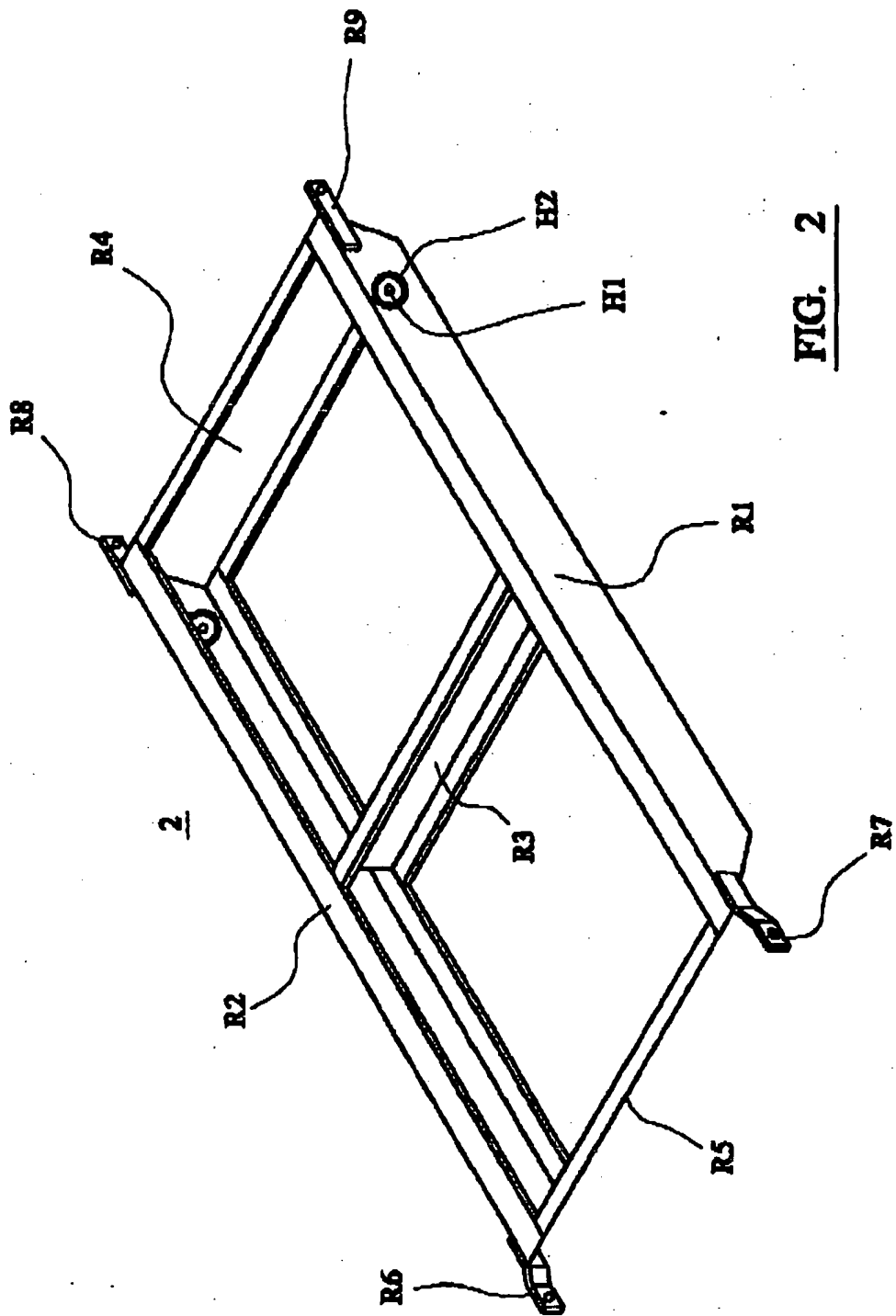


FIG. 2

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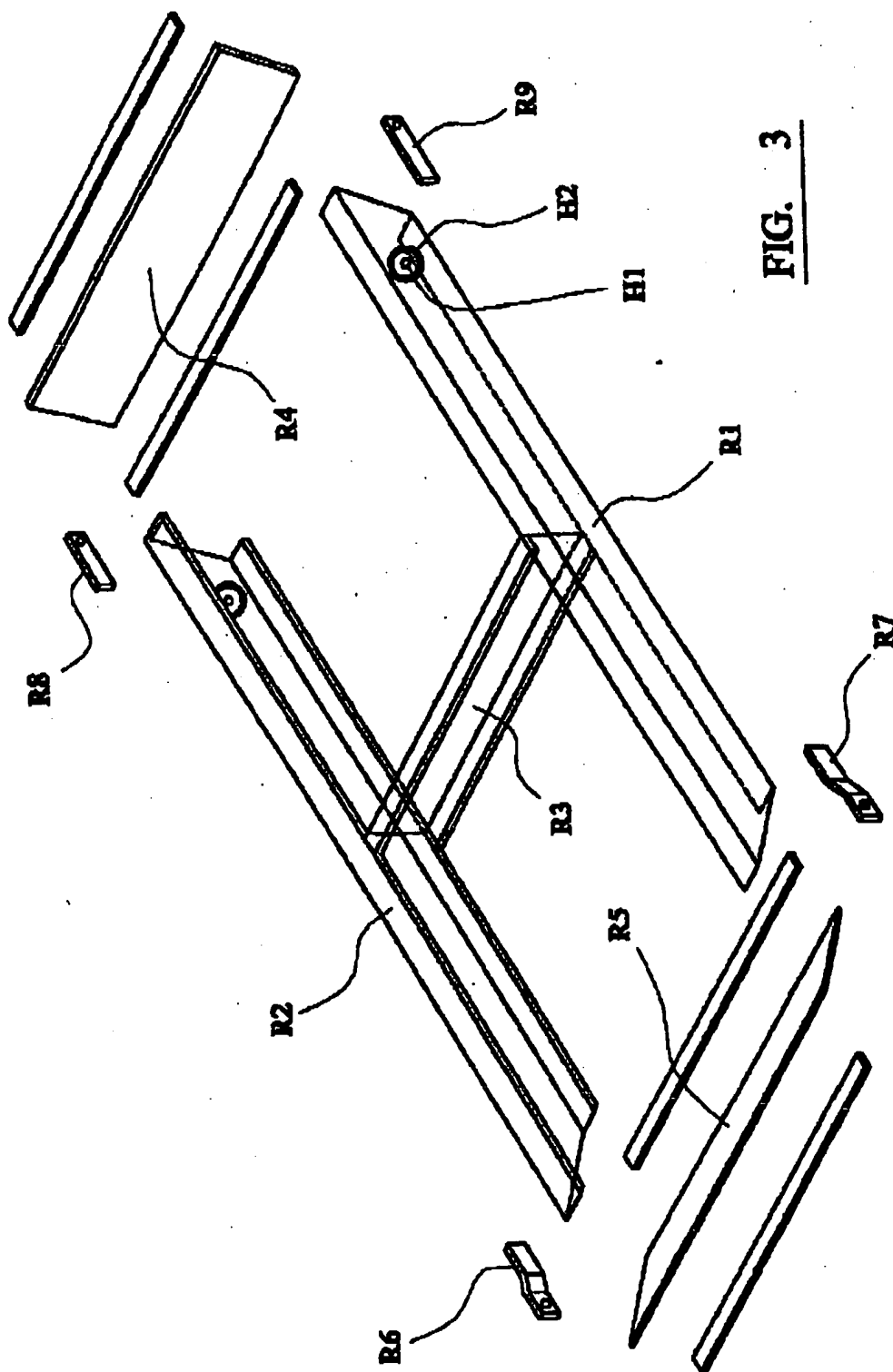


FIG. 3

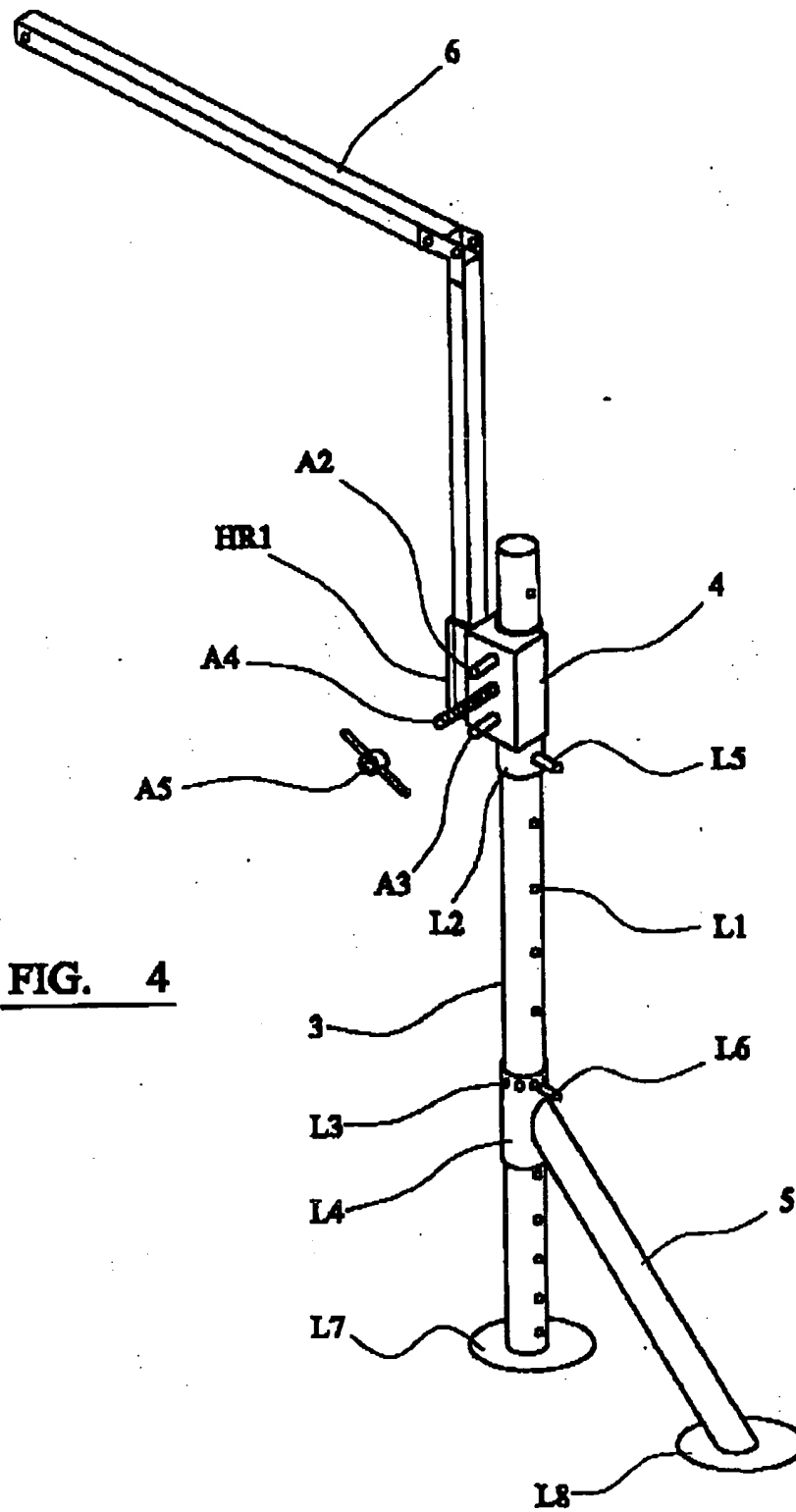


FIG. 4

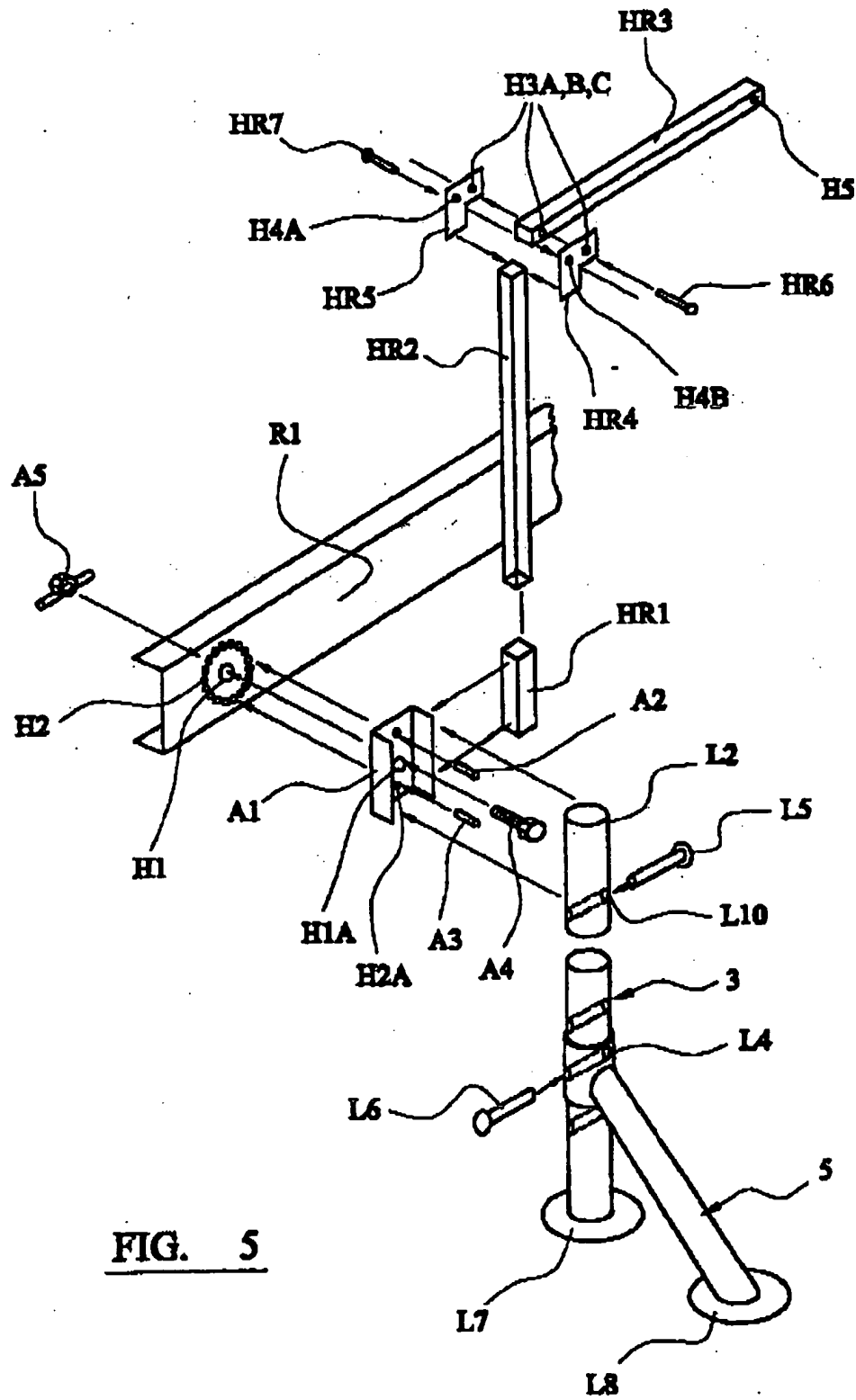


FIG. 5

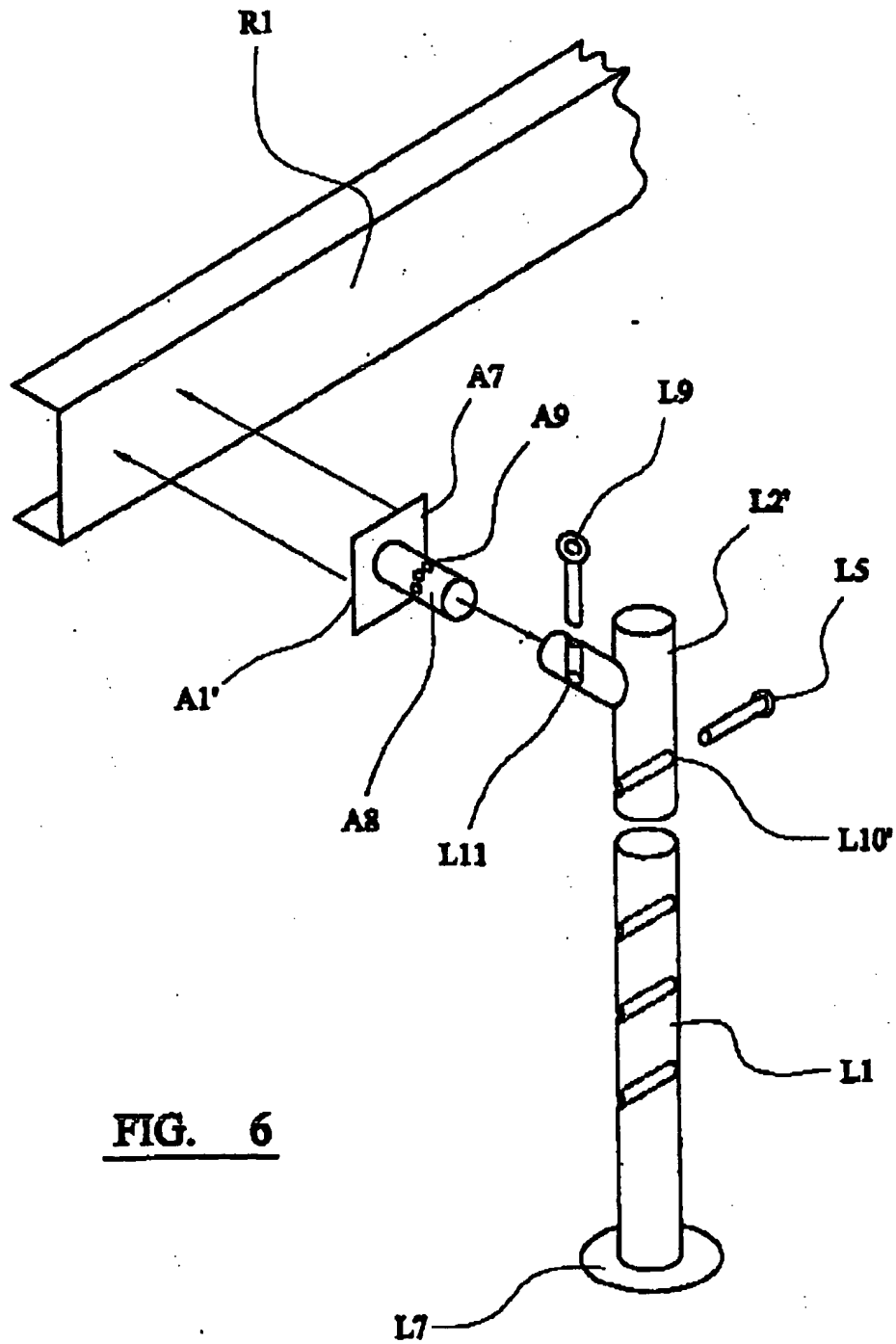


FIG. 6

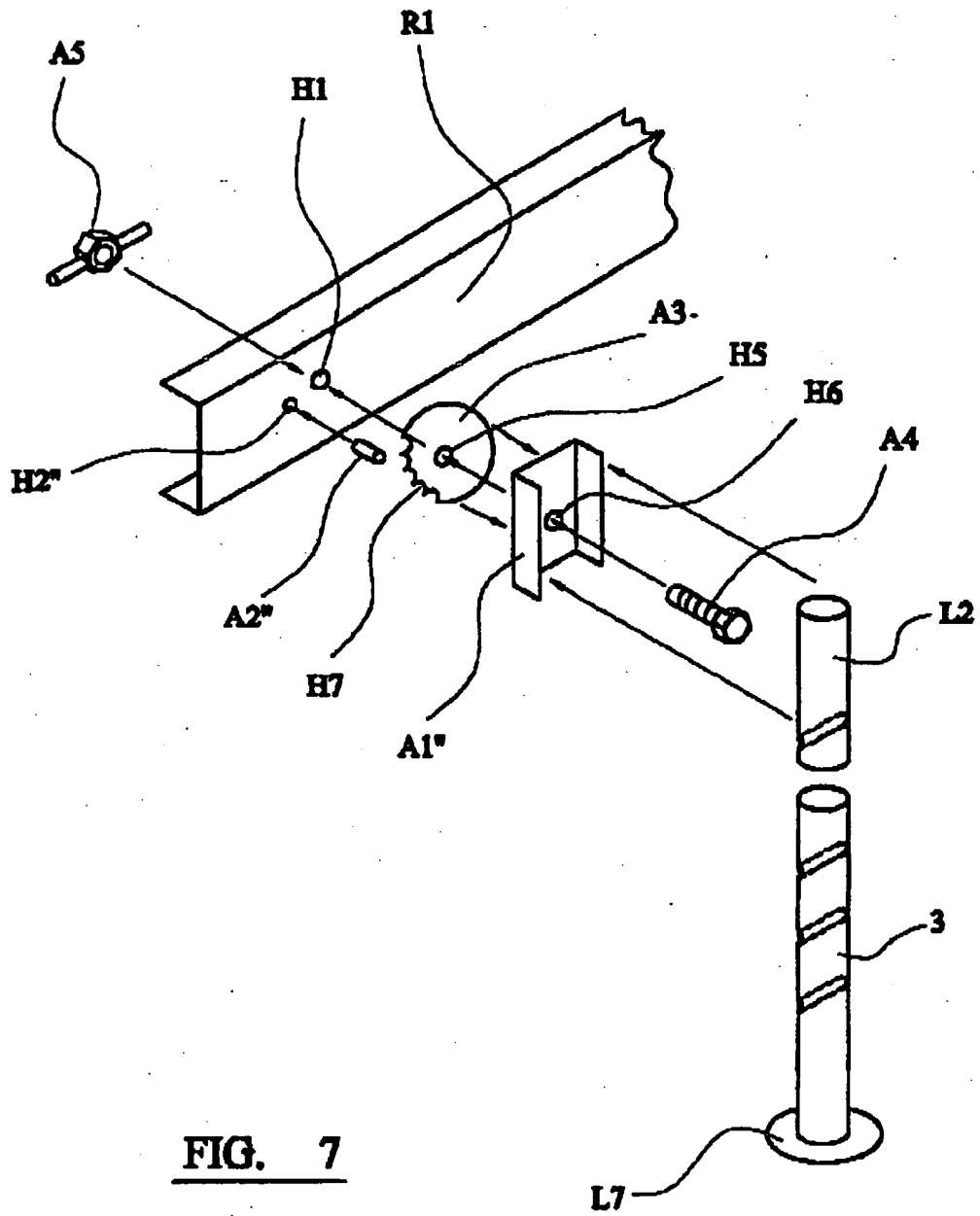


FIG. 7



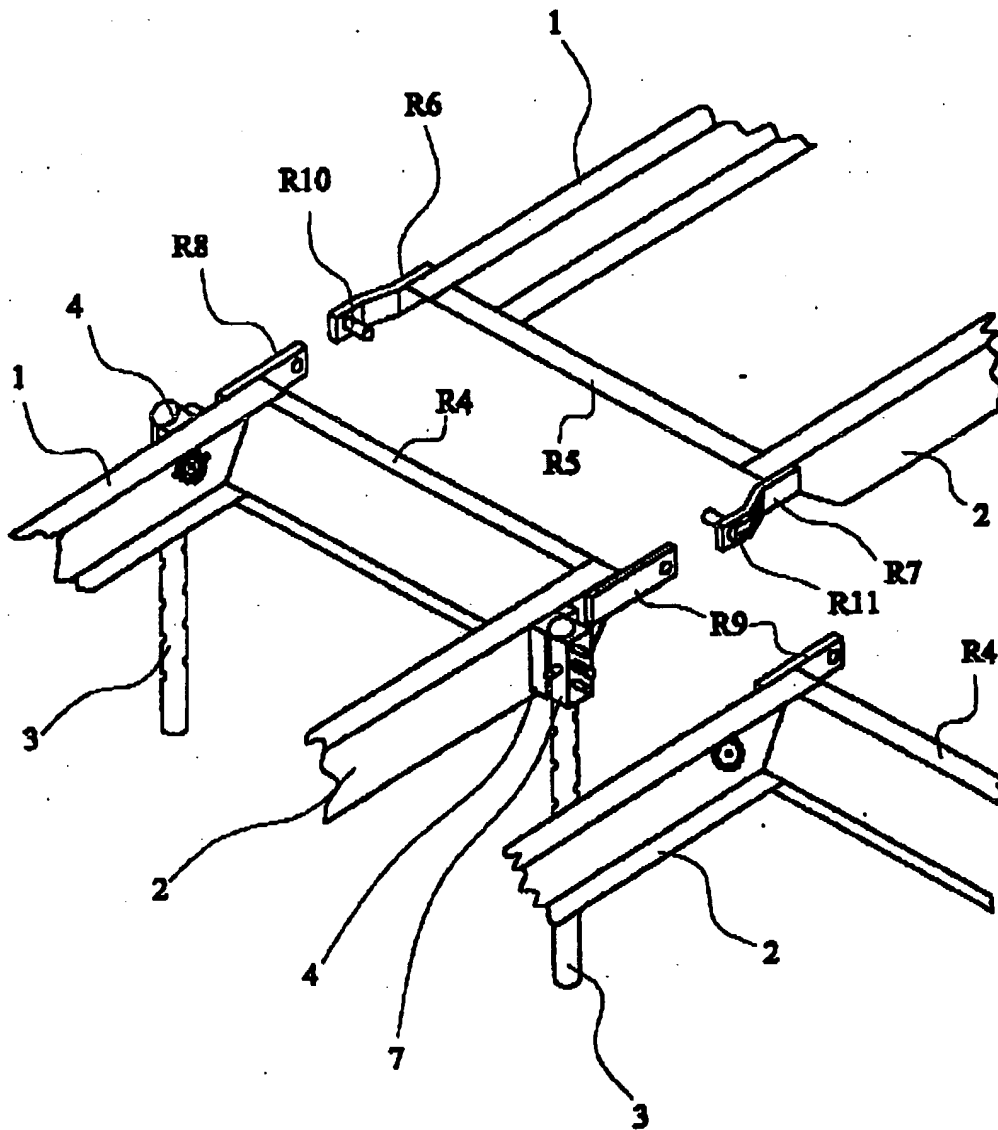


FIG. 8

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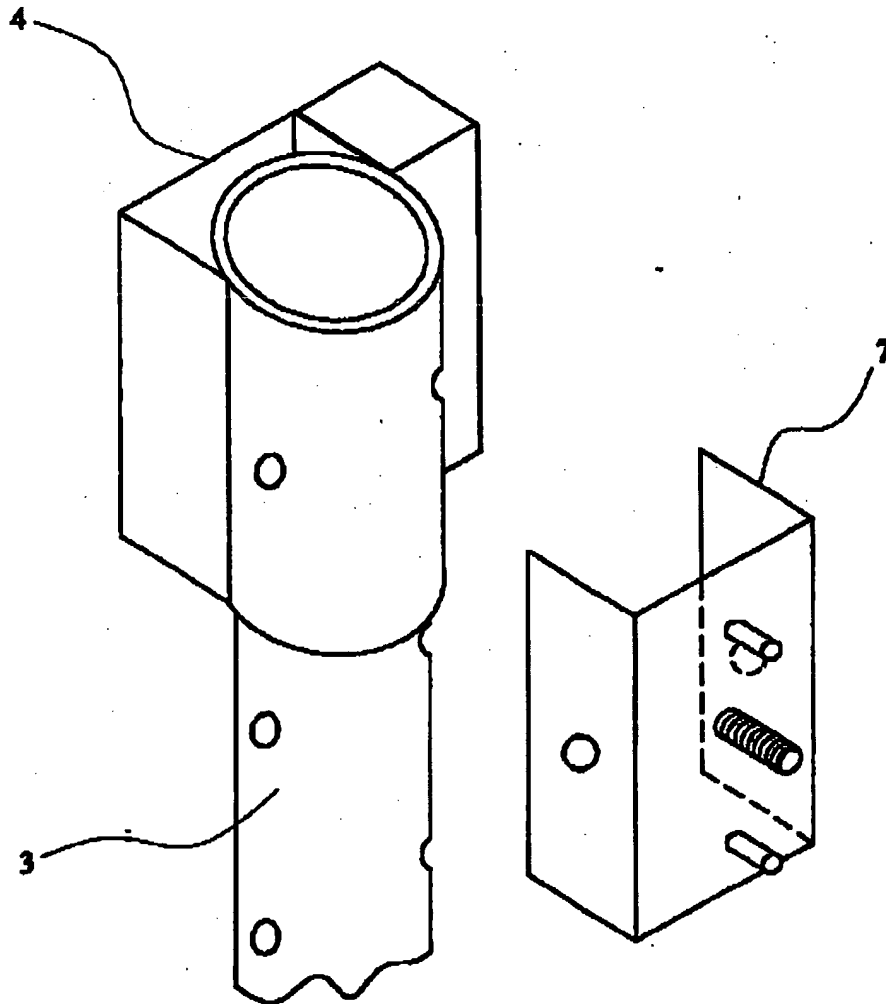


FIG. 9

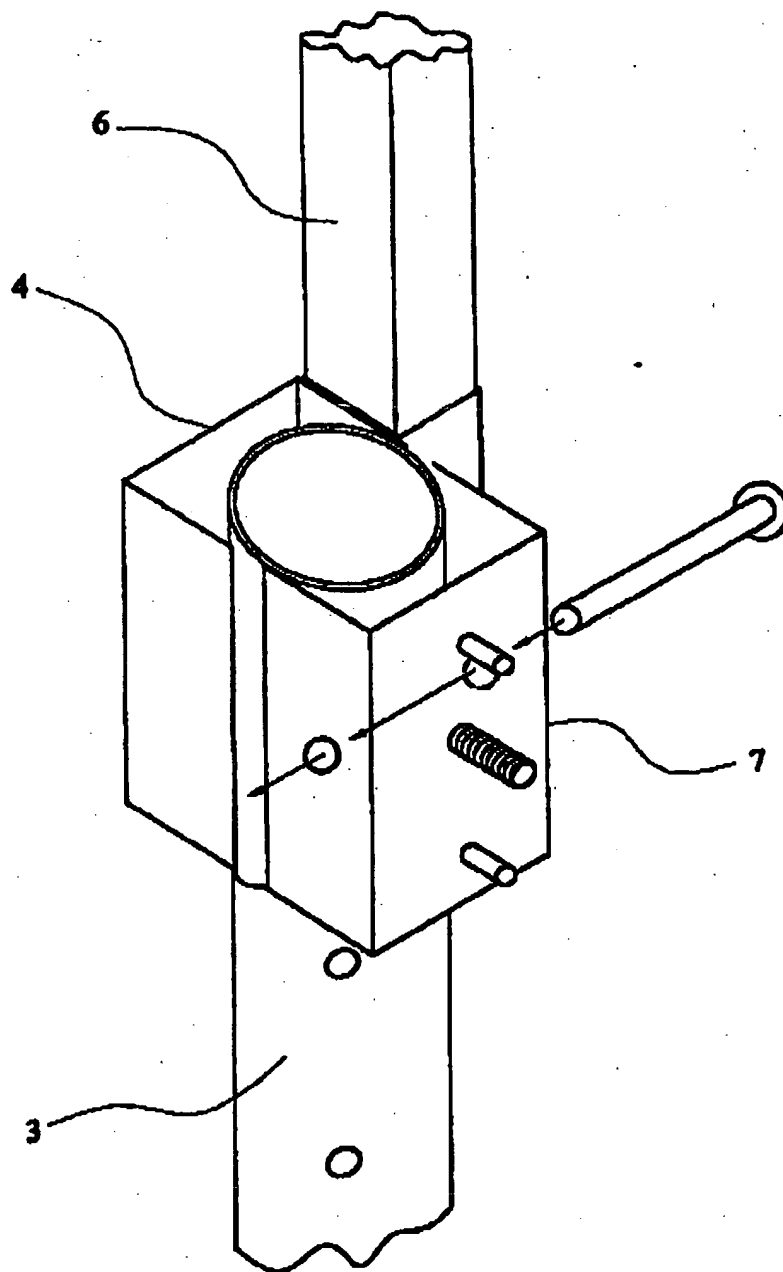


FIG. 10

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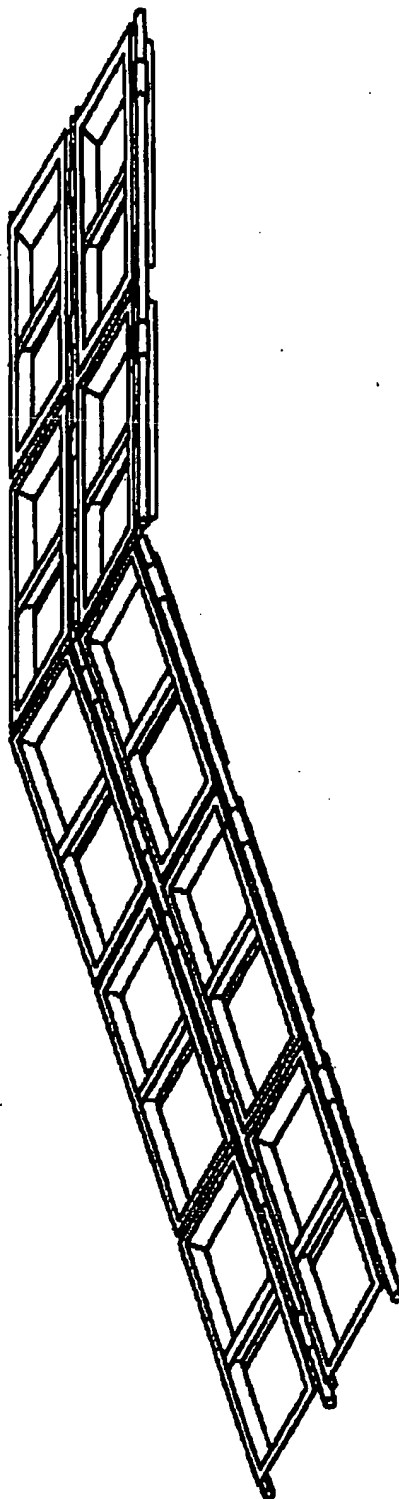


FIG. 11

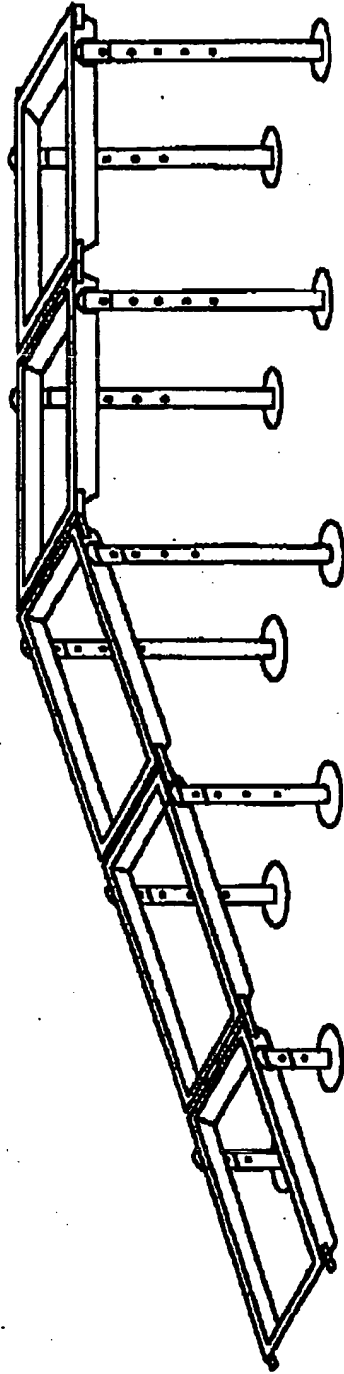


FIG. 12

A modular ramp

The invention relates to a modular ramp, in particular for use as a loading ramp or walkway.

Health and safety is now a major consideration in the workplace, in particular on building sites where the potential for injury is particularly high. When a ramp is required on a building site it is common practice to use scaffolding boards, joists, doors or any pieces of wood that come to hand. However this is not a safe practice as they are unlikely to be of the right length or width for the particular circumstances and are unlikely to be securely fastened. In addition they could become very slippery in wet or muddy conditions.

It is known in the prior art to have modular ramps for wheelchair access to buildings. US 4,807,317 discloses a ramp having a plurality of PVC leg assemblies and a plurality of ramp sections each extending between and mounted on a pair of adjacent leg assemblies. Each leg assembly includes a pair of legs and an interconnecting crossbar which is slidably received on the legs and adjustable in height. The ramp sections are hooked to the cross bars. Handrails are also slidably mounted on the legs.

This arrangement is suitable for wheelchair access, but is lacking in the rigidity and strength required to carry the heavy weights associated with building materials.

The present invention seeks to provide a versatile modular ramp that is strong enough to be used for carrying heavy loads and yet is of simple construction and capable of ready assembly and disassembly on site.

According to the present invention there is provided a modular ramp comprising a plurality of ramp modules, each ramp module comprising a ramp frame having a pair of opposing frame end members and a pair of opposing frame side members interconnecting said opposing end members, the ramp frame having a ramp cover, each ramp module further comprising a first support leg mountable on a first side member of the ramp frame and towards one end thereof and a second support leg mountable on a second side

member of the ramp frame and towards the same end thereof, the support legs being secured to the ramp frame by an adjustable mount, the adjustable mount being positioned at a desired elevation along the length of the respective leg, wherein each ramp frame has means for connection to an adjacent ramp frame and the adjustable mount allows the ramp frame to be selectively mounted on each of the support legs at one of a plurality of positions.

This arrangement has the advantage that all parts are rigidly connected to each other, thus providing a very stable and strong ramp. Each module comprises a minimal number of parts which is important in the building industry for achieving acceptance.

In a preferred embodiment the adjustable mount comprises a plate which in use lies parallel with and abuts the frame side member. This provides a large load bearing surface.

In a preferred embodiment each frame side member has a first frame hole and a plurality of second frame holes arranged remote from the first hole, and each plate has a first plate hole through which a securing member passes and at least one second plate hole through which a safety pin passes, the further plate hole having substantially the same diametrical spacing about the central plate hole as the plurality of second frame holes have about the central frame hole, the adjustable mount being mounted on the frame side member by passing the securing member through the central frame hole and the safety pin into a selected one of the second frame holes.

The plate preferably comprises at least two further plate holes each provided with a safety pin. This provides additional torsional strength between the adjusting mount and the ramp.

In another preferred embodiment the plate is fixable to the frame side member and has a tubular elongate member projecting therefrom and having a plurality of holes arranged around a circumference, a T-shaped leg holder having a tubular elongate member with a hole adapted to receive a pin, the tubular elongate member is mountable on the tubular elongate member of the mounting bracket and is locked thereto by a





Fig. 8 shows an embodiment of the modular ramp with no cross member, Fig. 9 shows two modular ramps side by side to form a larger ramp surface.

The modular ramp illustrated in Fig. 1 comprises a plurality of ramp modules 1 each including a ramp frame 2, a pair of legs 3 and an adjustable mount 4. Each ramp frame is provided with a top cover which has not been shown for reasons of clarity. The cover can be made of metal in the form of, in particular, a grid, expanding mesh, perforated plate or slotted plate. The covers are designed to give good grip even if when wet or muddy.

Referring to Figs. 2 and 3, the ramp frame 2 comprises two opposing frame side members R1, R2 and two opposing frame end members R4, R5 and a transverse cross member R3 extending between the side members R1 intermediate the end members R4, R5. Each of the members R1-R5 is of U-shaped cross-section. Frame side members R1, R2 are angled at their ends so that if necessary they can rest on the ground and also to allow the abutment of adjacent ramp as will be described in more detail below. The support frame can be cast in one piece or formed from several pressed pieces and welded together. A first female bracket R6 is welded to one end of the frame side member R4 and a second female bracket R7 is fixed at one end of frame side member R5, both being fixed at the same end of the frame. A male bracket R8 is fixed at the other end of frame side member R4 and a male bracket R9 is fixed at the other end of the frame side member R5. The male brackets R8 and R9 are planar and the female brackets R6 and R7 are offset outwardly such that the male brackets of one module overlap the female brackets of the adjacent module in a juxtaposed manner. The male and female brackets R6-R9 each have a hole towards the end remote from the support frame. In use each male bracket R8, R9 of one ramp module is pivotally connected to a female bracket R6, R7 of the adjacent ramp module by means of a pin R10, R11. In the embodiment illustrated in Fig. 8 each pin R10, R11 is spring loaded, allowing the pin to be permanently attached to the female bracket R6, R7.

Towards one end of each frame side member R1, R2 is a locating means for receiving an adjustable mount for a support leg. The locating means includes a central

hole H1 and a number of smaller holes H2 arranged substantially in a circle and concentric with the hole H1.

Figs. 4 and 5 show the leg and handrail mounting arrangements in more detail. In a preferred embodiment each leg is formed from hollow cylindrical tubing and has pairs of holes L1 located on a diameter of the tubing, each pair being spaced from the next along the length of the leg. A foot L7 may be attached to the bottom of the leg to spread the load.

Figs. 4 and 5 show an adjustable mount having a U-shaped mounting bracket A1 comprising a base portion and two side limbs. The base portion has a central hole H1<sub>A</sub> and two holes H2<sub>A</sub>, one each side of the central hole H1<sub>A</sub>. A securing bolt A4 is passed through the hole H1<sub>A</sub> and safety pins A2, A3 are passed through the holes H2<sub>A</sub>, the safety pins being welded to the mounting bracket A1. Attached to the rear of the mounting bracket A1 is a leg holder L2, into which the leg 3 is inserted. The leg is held in place by a pin L5 passing through holes L10 in the leg holder L2 and selected holes L1 in the leg 3 according to the desired length of the legs.

The adjustable mount 4 is mounted on the frame side R1 by passing the securing bolt A4 through the hole H1 and passing the safety pins A2 and A3 through selected holes H2. The holes H2 are selected according to the desired angle of the ramp section with respect to the legs 3. The safety pins A2, A3 stop the adjustable mount 4 from rotating once a wing nut A5 has been tightened on the securing bolt A4 to fasten the adjustable mount 4 to the ramp frame 2. The base portion of the mounting bracket is a flat plate which is held in contact with the surface of the frame side member and serves to spread the load over a wide area as well as providing a rigid connection between the leg and the ramp frame. The disassembled ramp modules 1 may be stored with the adjustable mounts 4 attached to either the ramp frame 2 or the support legs 3.

Also attached to the support leg 3 is a stabiliser arm 5 which can be fixed at various positions around the circumference of the support leg 3 and adjusted up or down. The stabiliser arm 5 has a cylindrical holder L4 for receiving a support leg 3, the cylindrical holder L4 being provided with a plurality of holes L3 spaced around a

circumference. When the holder L4 is inserted on the support leg 3 it is free to slide up and down the support leg 3 and also rotate around it. The stabiliser arm 5 is held in position on the leg 5 by means of a securing pin L6 passing through the holes L3 and L1 corresponding to the desired relative position of the stabiliser arm 5 and the support leg 3. The stabiliser arm may also be provided with a load spreading foot L8.

On one side of the adjustable mount 4 a handrail holder HR1 may optionally be provided for mounting a hand rail 6. L shaped brackets HR4 and HR5 are welded in place on the top on either side of handrail post HR2. Handrail HR3 is secured by means of a hinge pin HR6 passing through holes H3<sub>A,B,C</sub> and a hinge pin HR7 passing through holes H4<sub>A,B</sub>.

A method of assembly of the present invention will now be described with reference to the embodiment of figures 2-5. A ramp frame 2 having an adjustable mount 4 already attached is laid on the ground. The end of the ramp frame 2 having locating means for adjustable mounts 4 is lifted to the required height and a leg 3 is inserted in each leg holder L2 and attached by inserting a pin L5 through holes L10 and the desired holes L1. The wing nut A5 is slackened off until the safety pins A2, A3 can be withdrawn clear of the holes H2. Each adjustable mount 4 can then be rotated with respect to the ramp frame 2, thus enabling the support leg 3 to be rotated into a substantially vertical position. The safety pins A2, A3 are then inserted back into the appropriate holes H2 and the wing nut A5 is tightened. As many modules 1 as required can be added using the linking brackets R6-R9 at either end of the ramp frames 2.

A stabilising arm 5, if required, can be attached to the leg 3 before or after it is inserted into leg holder L2. If a handrail is required, this can be added after completion of the construction of the ramp.

Fig. 6 shows a second embodiment of an adjustable mount 4 for attaching a support leg 3 to the frame side member R1. A mounting bracket A1' comprises a flat plate member A7 welded to a hollow cylindrical member A8 projecting substantially perpendicularly from the plate member A7. The flat plate member A7 is welded to the frame side member R1 with the cylindrical member A8 projecting away from the frame

side member R1. A plurality of pairs of holes A9 are arranged around a circumference of the cylindrical member A8, each pair of holes A9 being located on a diameter of the tubing. Leg holder L2' comprises hollow cylindrical tubing arranged in a T-shape. The top of the T receives the support leg 3 and is locked thereon by a securing pin L5 passing through holes L10' of the leg holder L2 and a selected pair of holes L1 of the support leg 3. The remaining branch of the T is a cylindrical elongate member sized to fit either inside or over the mounting bracket A1' without play. The elongate member has two holes L11 located on a diameter and is locked in position on the mounting bracket A1' by passing a securing pin L9 through holes L11 and a selected pair of holes A9 according to the desired angle of the ramp.

Fig. 7 shows a third embodiment of an adjustable mount 4 for attaching a leg 3 to the frame side member R1. The frame side member R1 is provided with a hole H1 for receiving a securing bolt A4 and a hole H2'' for receiving a safety pin A2''. A U-shaped mounting bracket A1'' is provided with a central hole H6 in its base portion through which the securing bolt A4 passes. A flat plate securing disc A6 is welded to the mounting bracket and is provided with a central hole H5 through which the securing bolt A4 passes and a plurality of notches H7 along a section of its periphery. According to the desired angle of the ramp the safety pin A2'' is engaged with an appropriate one of the notches when the securing bolt A4 and wing nut A5 are loosened.

In the embodiment of Figs. 8-10 an arrangement is shown for side by side mounting of modular ramps. Only one support leg 3 is necessary between each pair of ramps. This is achieved by constructing one of the ramps as described in the various embodiments above. A second ramp is provided with an adjustable adapter mount 7 in place of the adapter mount 4. The adjustable adapter mount 7 consists of a U-shaped mounting bracket which is mounted to the ramp frame in the same way as the mounting bracket A1 of Fig. 5. Adjustable adapter mount 7 has a hole on each side limb of the U-shaped mounting bracket, which holes align with holes L1 in the support leg 3. A single securing pin L5 is passed through the holes in the adjustable adapter mount 7, through the holes L10 in the leg holder L2 and through selected holes L1 in the support leg 3.

Fig. 11 illustrates a number of modular ramps used side by side to provide a broader ramp surface. In this embodiment the adjusting mounts are arranged such that the leg holders can receive scaffolding tubes arranged parallel with the frame side members.

Fig. 12 shows a modular ramp where the ramp frame does not have the reinforcing cross members. This makes the ramp frame easier and cheaper to manufacture.

All component parts are preferably formed from steel. All the tubular parts are preferably hollow. Although it is preferable for them to be cylindrical they can take any geometrical form.

### Claims

1. *As per prior art* A modular ramp comprising a plurality of ramp modules, each ramp module comprising a ramp frame having a pair of opposing frame end members and a pair of opposing frame side members interconnecting said opposing end members, the ramp frame having a ramp cover, each ramp module further comprising a first support leg mountable on a first side member of the ramp frame and towards one end thereof and a second support leg mountable on a second side member of the ramp frame and towards the same end thereof, the support legs being secured to the ramp frame by an adjustable mount, the adjustable mount being positioned at a desired elevation along the length of the respective leg, wherein each ramp frame has means for connection to an adjacent ramp frame and the adjustable mount allows the ramp frame to be selectively mounted on each of the support legs at one of a plurality of inclinations.

2. A modular ramp according to Claim 1, wherein the adjustable mount comprises a plate which in use lies parallel with and abuts the frame side member.

3. A modular ramp according to Claim 1, wherein the ramp frame is provided with a plurality of recesses and the adjustable mount is provided with at least one projection.

4. A modular ramp according to Claim 1, wherein the adjustable mount is provided with a plurality of recesses and the ramp frame is provided with at least one projection.

5. A modular ramp according to Claim 2, wherein each frame side member has a first frame hole and a plurality of second frame holes arranged remote from the first hole, and each plate has a first plate hole through which a securing member passes and at least one second plate hole through which a safety pin passes, the further plate hole having substantially the same diametrical spacing about the central plate hole as the plurality of second frame holes have about the central frame hole, the adjustable mount being mounted on the frame side member by passing the securing member through the central frame hole and the safety pin into a selected one of the second frame holes.

6. A modular ramp according to Claim 5, wherein the plate comprises at least two second plate holes each provided with a safety pin for engagement with selected second frame holes.

7. A modular ramp according to Claim 2, wherein the plate is fixable to the frame side member and has a tubular elongate member projecting therefrom and having a plurality of holes arranged around a circumference, a T-shaped leg holder having a tubular elongate member with a hole adapted to receive a pin, the tubular elongate member is mountable on the tubular elongate member of the mounting bracket and is locked thereto by a securing pin passing through a selected one of said holes in the elongate member of the mounting bracket and the hole of the elongate member of the leg holder.

8. A modular ramp according to Claim 2, wherein each frame side member has a first frame hole and a further frame hole in which further frame hole a safety pin is mounted, each plate has a hole through which a securing member passes, a securing disc being fixed to each plate, the securing disc having a hole through which the securing member passes and a plurality of notches along at least a section of the disc periphery, the adjustable mount being mounted on the frame side member by passing the securing member through the first frame hole and aligning the safety pin to engage with a selected one of the notches.

9. A modular ramp according to Claim 8, wherein each frame side member has at least two further frame holes in each of which a safety pin is mounted, each safety pin engaging a notch in the disc periphery.

10. A modular ramp according to Claim 1, wherein the support leg is a scaffolding pole which passes through at least two leg holders of adjusting mounts of adjacent ramp modules.

11. A modular ramp according to any of the preceding claims, wherein the adjustable mount further comprises a holder for a hand rail.

12. A modular ramp according to any of the preceding claims, wherein a stabilising arm is attached to the support leg.
13. A ramp comprising a plurality of modular ramps according to any of the preceding claims, wherein on adjacent sides of adjacent modular ramps, one of the first and second support legs of a first modular ramp also functions as the other of the first or second support legs of the adjacent modular ramp.
14. A modular ramp, substantially as described herein with reference to, and as illustrated in, the accompanying drawings.
15. A ramp, substantially as described herein with reference to, and as illustrated in, the accompanying drawings.





Application No: GB 0012537.7  
Claims searched: 1-15

Examiner: Dave McMunn  
Date of search: 15 November 2000

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): B8H (H3).

Int Cl (Ed.7): B65G 69/28. B66F 7/24. E01D 15/133.

Other: ONLINE : WPI, EPODOC, JAPIO.

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2,238,289 A (KELLETT & JACKSON). Note lines 2-11, page 5	1
A	GB 0,417,969 (PITMAN). Note leg braces 12, 13 & leg apertures 16	1
A	US 5,740,575 (GORDAN). Note adjustable height legs and brackets 70, 72 & Fig 2	1
A	US 4,912,796 (CRUMP). Note ramp apertures 29 & adjustable position legs 49, 50, Fig 5	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
z	Member of the same patent family	B	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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